

FORM PTO-1390 U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371		ATTORNEY'S DOCKET NUMBER: 98054 US
INTERNATIONAL APPLICATION NO.: PCT/SE99/00915		U.S. APPLN. NO. (If known, see 37 CFR 1.5) 09/701306
INTERNATIONAL FILING DATE: 28 May 1999		PRIORITY DATE CLAIMED: 29 May 1998
TITLE OF INVENTION: BICYCLE		
APPLICANT(S) FOR DO/EO/US: Dieter HERBERT		
Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:		
1.	<input checked="" type="checkbox"/>	This is a FIRST submission of items concerning a filing under 35 U.S.C. 371.
2.	<input type="checkbox"/>	This is a SECOND or SUBSEQUENT submission of items concerning a filing under 35 U.S.C. 371.
3.	<input checked="" type="checkbox"/>	This express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1).
4.	<input checked="" type="checkbox"/>	A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.
5.	<input checked="" type="checkbox"/>	A copy of the International Application as filed (35 U.S.C. 371(c)(2)) <ul style="list-style-type: none"> a. <input checked="" type="checkbox"/> is transmitted herewith (required only if not transmitted by the International Bureau). b. <input checked="" type="checkbox"/> has been transmitted by the International Bureau. (see attached copy of PCT/IB/308) c. <input type="checkbox"/> is not required, as the application was filed in the United States Receiving Office (RO/US).
6.	<input type="checkbox"/>	A translation of the International Application into English (35 U.S.C. 371(c)(2)).
7.	<input type="checkbox"/>	Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3)). <ul style="list-style-type: none"> a. <input type="checkbox"/> are transmitted herewith (required only if not transmitted by the International Bureau). b. <input type="checkbox"/> have been transmitted by the International Bureau. c. <input type="checkbox"/> have not been made; however, the time limit for making such amendments has NOT expired. d. <input type="checkbox"/> have not been made and will not be made.
8.	<input type="checkbox"/>	A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
9.	<input checked="" type="checkbox"/>	An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).
10.	<input type="checkbox"/>	A translation of the annexes of the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).
Item 11. to 16. below concern document(s) or information included:		
11.	<input checked="" type="checkbox"/>	An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
12.	<input type="checkbox"/>	An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
13.	<input checked="" type="checkbox"/>	A FIRST preliminary amendment.
14.	<input type="checkbox"/>	A SECOND or SUBSEQUENT preliminary amendment.
15.	<input type="checkbox"/>	A substitute specification.
16.	<input checked="" type="checkbox"/>	A change of power of attorney and/or address letter. Other items or information: International Preliminary Examination Report (PCT/IPEA/409) International Search Report (PCT/ISA/210) Form PCT/IB/308 Cover page of the International Publication No. WO 99/62600 Application Data Sheet

U.S. APPLICATION NO. (if known) (37 CFR 1.47)		INTERNATIONAL APPLICATION NO.	ATTORNEY'S DOCKET NO.																																																																						
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<p>17. <input checked="" type="checkbox"/> The following fees are submitted:</p> <p>BASIC NATIONAL FEE (37 CFR 1.492(a)(1)-(5)):</p> <p>Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO \$ 1,000.00</p> <p>International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO \$ 860.00</p> <p>International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO \$ 710.00</p> <p>International preliminary examination fee (37 CFR 1.482) paid to USPTO but all claims did not satisfy provisions of PCT Article 33(1)-(4) \$ 690.00</p> <p>International preliminary examination fee (37 CFR 1.482) paid to USPTO and all claims satisfied provisions of PCT Article 33(1)-(4) \$ 100.00</p>																																																																									
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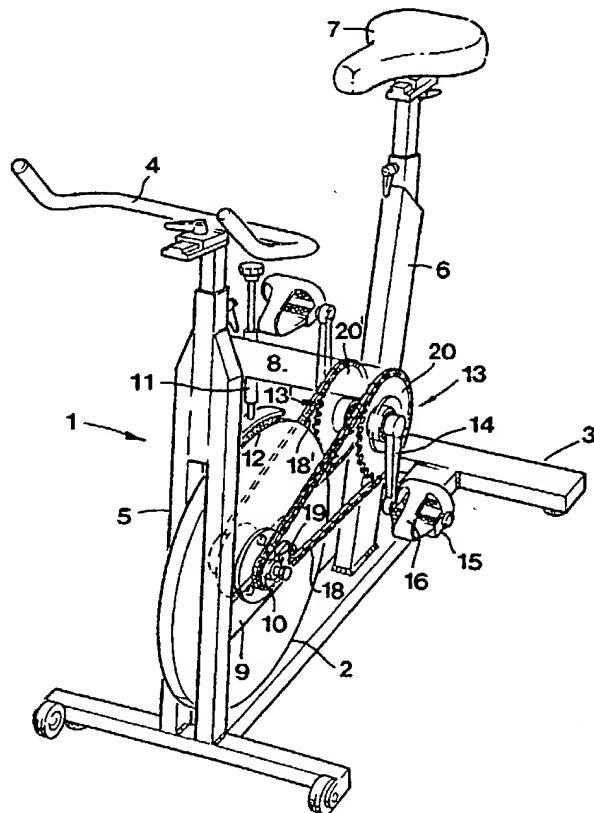
INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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(21) International Application Number:	PCT/SE99/00915	(81) Designated States: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZA, ZW, ARPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).
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(71)(72) Applicant and Inventor:	HERBERT, Dieter [SE/SE]; Hammarkulletorget 14, S-424 37 Angered (SE).	
(74) Agent:	JOHANSSON, Lars; Lars Johansson Patentbyrå AB, P.O. Box 68, S-801 02 Gävle (SE).	

(54) Title: BICYCLE

(57) Abstract

A bicycle comprises a frame (1) and a wheel (2) rotatably mounted in relation thereto, which wheel is drivable by means of two pedal devices (13, 13') including pedal-equipped arms (14). The two pedal devices (13, 13') are individually mounted in different bearings and connected to the wheel (2) via two different transmissions (18, 18'), which separately co-operates with a mechanical clutch which comprises a dog being movable to and from opposite shoulder surfaces of which a first one guarantees driving the wheel (2) when the dog in an active state is pressed against the same, and the second one gives rise to noise when the dog in an inactive state collides with the same.



09/701306
528 Rec'd PCT/PTO 28 NOV 2000

PATENTS

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of

Dieter HERBERT

Serial No. (unknown)

Filed herewith

BICYCLE

PRELIMINARY AMENDMENT

Commissioner for Patents

Washington, D.C. 20231

Sir:

Prior to the first Official Action and calculation of the filing fee, please amend the above-identified application as follows:

IN THE CLAIMS:

Claim 4, line 1, change "any one of the preceding claims," to --claim 1,--.

Add the following new claims:

--5. Bicycle according to claim 3, characterized in that the individual transmission consists of an endless chain (18, 18') which is in engagement with a first chain wheel (19, 19') being connected to the clutch, as well as a second chain wheel (20, 20') which is connected to the pedal device (13, 13') .--

Dieter HERBERT

R E M A R K S

The above changes in the claims merely place this national phase application in the same condition as it was during Chapter II of the international phase, with the multiple dependencies being removed.

Respectfully submitted,

YOUNG & THOMPSON

By Benoit Castel
Benoit Castel
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November 28, 2000

BICYCLE

Technical Field of the Invention

This invention relates to a bicycle of the type that 5 comprises a frame and a wheel rotatably mounted in relation thereto, which wheel is drivable by means of two pedal devices having pedal-equipped arms.

Background of the Invention

10 In previously known training bicycles, which in more modern versions frequently are used for so called spinning, the two pedal devices are oriented in 180° to each other and rigidly united to a mutual shaft to which a chain wheel for one single transmission in the form of an endless chain is 15 rigidly united, which transmits the driving power to the wheel, which power the exercising person applies to the pedals via his/her legs. In practice, this construction gives a mediocre and partly monotonous training of the body. Thus, energy demanding power transmission from the legs of the user to 20 each individual pedal device takes place in the main only the half revolution during which the pedal device is brought to move in the direction forwards from the area of an upper dead centre to the area of a lower dead centre. During the return movement backwards from the lower dead centre towards the upper dead centre, the individual leg is, however, kept in all 25 essentials in a position of rest so far that the same inactively accompanies the pedal in question when the other leg depresses the opposite pedal. This pattern of movement results in a low physiological degree of efficiency, inasmuch as the individual leg's own weight (which frequently is within the 30 range of 15-25 kg) contributes to apply the individual pedal force during the single movement which requires marked energy consumption, viz. the depression, as well as inasmuch as only certain muscle groups in, above all, the exercising person's 35 legs, back and stomach need to be activated during the movement of depression, viz. the muscles which can apply the pedal compressive force.

Objects and Features of the Invention

The present invention aims at obviating the above-mentioned shortcomings of previously known bicycles and at providing an improved bicycle. Thus, a primary object of the 5 invention is to provide a bicycle which enables a more all-round training and which, by simple means, draws the user's attention to such moments when the work of the body is not carried out in a physiologically optimum way.

According to the invention, the above-mentioned object 10 is attained by the features defined in the characterizing clause of claim 1. Preferred embodiments of the invention are furthermore defined in the dependent claims.

Brief description of the Appended Drawings

15 In the drawings:

Fig 1 is a perspective view of the bicycle according to the invention,

Fig 2 is a partly cut planar view showing a pedal mechanism included in the bicycle together with a balance wheel,

20 Fig 3 is an enlarged exploded view showing a hub construction included in the balance wheel,

Fig 4 is a side view of a clutch included in the hub construction in a first functional state, and

25 Fig 5 is an analogous side view showing the same clutch in a second functional state.

Detailed Description of a Preferred Embodiment of the Invention

The bicycle shown in fig 1 comprises a frame in its 30 entirety designated 1 as well as a wheel 2 in the shape of a balance wheel rotatably mounted in relation thereto. The frame 1 is composed of a base 3, a front fork 5 provided with a support handle 4, as well as a rear upright 6 which carries a saddle 7. An intermediate piece 8 extends between the front 35 fork 5 and the upright 6. Schematically outlined brackets 9 carrying a shaft 10 for the wheel 2 extend backwards from the two spaced-apart branches of the front fork. A brake device 11 mounted on the intermediate piece 8 has the purpose of applying a variable brake effect to the balance wheel. In the shown

example, the brake device 11 includes a lining 12 acting against the periphery of the wheel, which lining may be pressed variously hard against the wheel by means of a screw.

In order to drive the wheel 2, a mechanism is arranged including two pedal devices 13, 13' each one of which having an arm 14 with an oblique pedal 15, more precisely a pedal of the type that includes a shackle 16 in which the front part of a user's foot may be engaged.

As far as the shown bicycle has been described hitherto, the same is in all essentials previously known.

New and characteristic for the bicycle according to the invention is that the two pedal devices 13, 13' are individually mounted in two various bearings 17, 17' (see fig 2) and connected to the balance wheel 2 via two different transmissions 18, 18'. In the shown example, these transmissions consist of endless chains, known per se, which in the front are in engagement with first toothed wheels or cog wheels 19, 19' and at the rear co-operate with second cog wheels 20, 20' included in the two pedal devices 13, 13'.

Reference is now made to fig 3, which in detail illustrates the hub construction of the balance wheel. The shaft 10 is insertable in holes 21 in the brackets 9 and fixable in relation thereto by means of screws 22 and washers 23. The position of the shaft may be finely adjusted by means of set screws 24. A tube piece 25 is rotatably mounted on the shaft 10, which piece is rigidly connected to the balance wheel 2 via flanged rings 26, being pressable against the wheel via nipples 27. Although the mounting of the tube piece 25 in relation to the shaft 10 may be realized in various ways, in practice needle bearings 28 are preferred for this purpose. Furthermore, at each end of the tube piece 25, two cages 29, 29' are rotatably mounted on the shaft 10 with which cages the two front chain wheels 19, 19' are rigidly connected. Also the cages 29, 29' are advantageously mounted on the shaft by means of needle bearings 28.

In each one of the two end portions of the tube piece 25, a number of recesses 30 are provided which are separately delimited by tangentially spaced-apart, opposite shoulder surfaces 31, 32. Each such shoulder surface suitably extends ra-

dially in relation to the geometric centre axis of the shaft, i.e. perpendicularly to a tangent to the cylindric envelope surface of the shaft. In this manner, the recession gets a sector-like shape, as may be clearly seen in figs 4 and 5. In 5 the shown example, the tube piece includes three equidistantly spaced-apart recesses. In this case, the sector-shaped recession may, for instance, have an arc length within the range of 40-80°, suitably 50-70°.

A number of dogs or fingers 33 corresponding to the 10 number of recesses 30 are provided on the inwardly turned end portion of each cage 29, 29'. Also these fingers 33 are cross-section-wise sector-shaped, although with an arc length which is smaller than the arc length of a co-operating recess 30 in which the finger engages. In practice, the individual finger 15 may have a sector arc length which is 15-25° less than the arc length of the recession. Like the recessions 30, the fingers 33 are equidistantly spaced-apart. By the fact that the individual finger is smaller than the appurtenant recess, the individual cage 29 and 29', respectively, may move between opposite 20 end positions in relation to the tube piece 25, viz. between an end position in which front shoulder surfaces on the fingers abut against front shoulder surfaces in the recessions and an opposite end position in which rear shoulder surfaces on the fingers abut against rear shoulder surfaces in the recessions. 25

The Function and Advantages of the Invention

The present invention is based on the understanding that physiologically optimal training results are only attained if the two legs of the exercising person continuously work entire revolutions, i.e. not only during the half revolution when the individual leg carries out a depression movement, but also during each subsequent return movement when the 30 pedal is to be brought backwards from the lower dead centre thereof towards the upper dead centre thereof. Due to this reason, the two pedals of the bicycle according to the invention are equipped with means for fixation of the foot or shoe of the exercising person. In the shown example, the pedals 35 include a conventional shackle 16 in which the foot may be in-

serted. However, it is also feasible to form the pedal with other means for the same purpose, e.g. snap fasteners for the shoes of the exercising person. The essential thing is only that the foot may carry the pedal with it actively, not only during the depression phase but also during the return phase.

Optimum body exercise is attained when the two legs of the user continuously apply driving power to the balance wheel 2. When one of the pedals, e.g. the one which is included in the pedal device 13 for the left leg of the user, is depressed, the appurtenant clutch in the hub construction of the balance wheel will transmit power to the balance wheel by the fact that the three carrier fingers 33 of the clutch cages 29 are pressed against the front shoulder surfaces 31 such as is illustrated in fig 4. If the right leg during the simultaneous return movement for the appurtenant pedal works actively, i.e. drives or lifts the pedal upwards, also the clutch cage 29' will work in the same way, i.e. the carrier fingers of the clutch cage 29' will be pressed against the front shoulder surfaces 31 in the appurtenant recesses 30. In doing so, also the right leg drives the balance wheel in an active manner. However, if the right leg would not be activated to the same extent as the left one, the clutch cage 29' will lag behind or be offset in phase in relation to the clutch cage 29 co-operating with the left leg. This results in that each individual carrier finger on the clutch cage 29' will move a distance backwards in the appurtenant recesses and, in a very short time, collide with the rear shoulder surfaces 32 of the recessions. As has been verified through tests made, this collision gives rise to a noise which is easily audible by the user. His/her attention is then paid, in a distinct way, to the fact that the leg in question does not work as active as the other leg. This is something which in turn gives a possibility to immediately correct this way of working, simply by applying more muscular power to the leg in question.

In practice, it should be most ordinary that the lifting leg will lag behind the depressing leg. However, the construction according to the invention also enables correc-

tion of the opposite conditions, if this peradventure would occur.

A substantial advantage of the bicycle according to the invention is that the same by way of simple, mechanical means provides opportunities for an all-round body exercise in that the user is made conscious if one of the legs does not work in an optimal way, whereby instantaneous correction may take place. In other words, opportunities are provided for an intensified training during which a plurality of additional muscle groups are activated apart from the ones which are required for only depressing a pedal during half a revolution.

Feasible Modifications of the Invention

The invention is not solely restricted to the described example of embodiment. Although the invention above has been described only in connection with an immovable cycle exerciser, the same may also apply in connection with multi-wheeled, movable bicycles, e.g. racing bicycles. In the last-mentioned case, the described construction may be used not only with the purpose of intensifying the muscle work of the body, but also with the purpose of increasing the driving of a wheel and thereby the top speed of the bicycle. In other words, the invention may also be used for achieving an improved degree of efficiency in the bicycle work as such.

Although the two clutches between the chains and the wheel in the example are made with three dogs co-operating with as many recesses in the tube piece mounted on the shaft, also fewer dogs, e.g. only one, may be used. It should also be pointed out that other transmissions, e.g. V-belts, might be used instead of chains. The thinner dogs may also be provided on the centre tube piece and the wider recessions may be provided in the chain wheel-equipped cages. In conclusion, it should be mentioned that the individual mounting of the pedal devices in two spaced-apart bearings makes it possible to place the pedal devices at various levels. In this way, the bicycle may be used by people with a handicap relating to legs and feet, e.g. people with differently long legs. In doing so it is also feasible to make at least one of the bearings adjustable and fixable in various positions.

Claims

1. Bicycle including a frame (1) and a wheel (2) rotatably mounted in relation thereto, which wheel is drivable by means of two pedal devices (13, 13') having pedal-equipped arms (14), characterized in that the two pedal devices (13, 13') are individually mounted in different bearings (17, 17') and connected to the wheel (2) via two different transmissions (18, 18'), which separately co-operates with a mechanical clutch which comprises a dog (33) being movable to and fro opposite shoulder surfaces (31, 32) of which a first one (31) guarantees driving of the wheel (2) when the dog (33) in an active state is pressed against the same, and the other one (32) gives rise to noise when the dog in an inactive state collides with the same.
2. Bicycle according to claim 1, characterized in that a finger (33) serves as dog and is applied on a cage (29, 29') co-operating with the individual transmission (18, 18'), which cage is rotatably mounted in relation to a central shaft (10) for the wheel (2), and which engages a recess (30) in a part (25) rigidly united with the wheel (2) and delimited between said first and second shoulder surfaces (31, 32).
3. Bicycle according to claim 2, characterized in that the cage (29, 29') has three fingers (33) which engage a corresponding number of recesses (30) in said wheel part (25).
4. Bicycle according to any one of the preceding claims, characterized in that the individual transmission consists of an endless chain (18, 18') which is in engagement with a first chain wheel (19, 19') being connected to the clutch, as well as a second chain wheel (20, 20') which is connected to the pedal device (13, 13').

Abstract

A bicycle comprises a frame (1) and a wheel (2) rotatably mounted in relation thereto, which wheel is drivable by means of two pedal devices (13, 13') including pedal-equipped arms (14). The two pedal devices (13, 13') are individually mounted in different bearings and connected to the wheel (2) via two different transmissions (18, 18'), which separately co-operates with a mechanical clutch which comprises a dog being movable to and fro opposite shoulder surfaces of which a first one guarantees driving the wheel (2) when the dog in an active state is pressed against the same, and the second one gives rise to noise when the dog in an inactive state collides with the same.

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Publication picture: Fig

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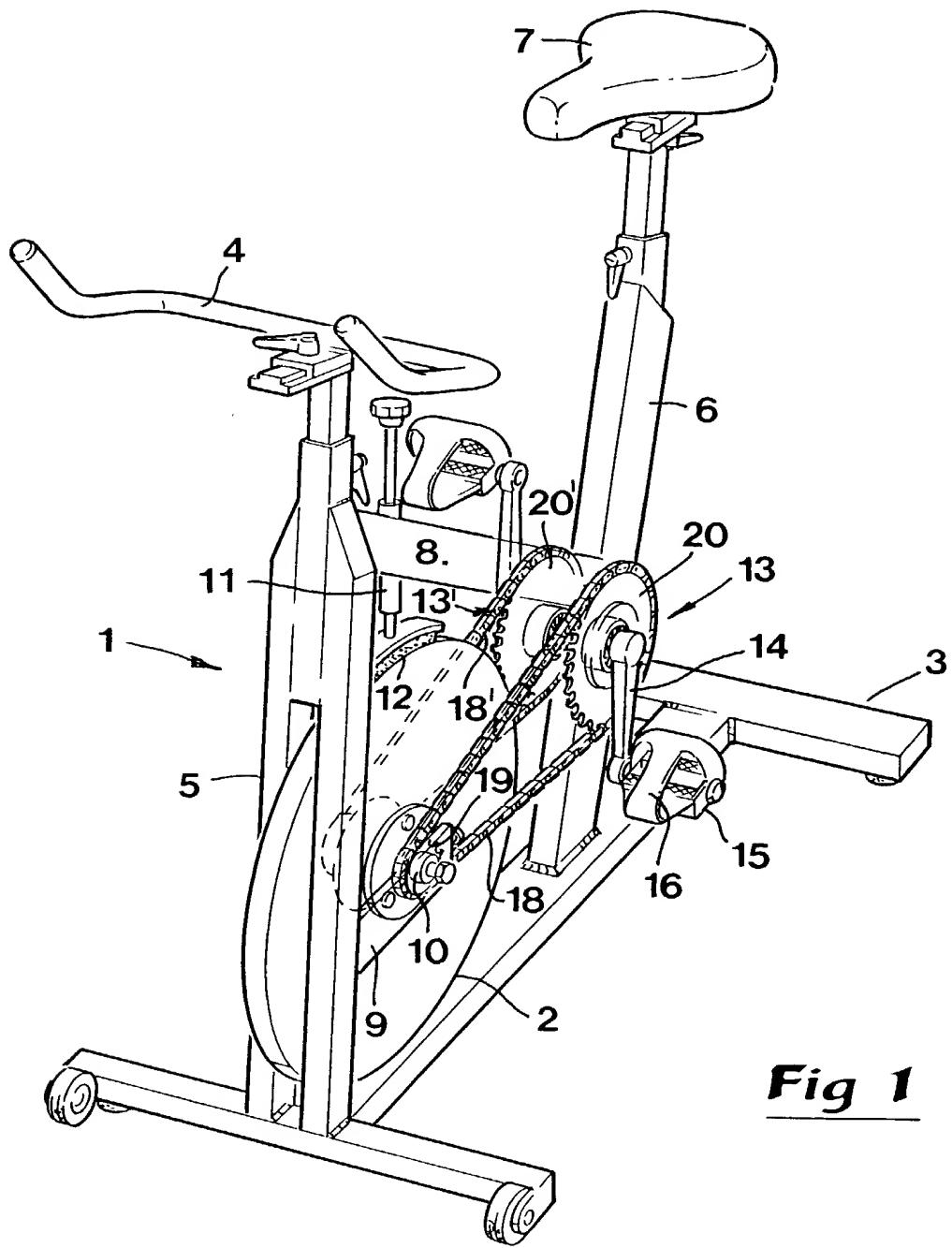
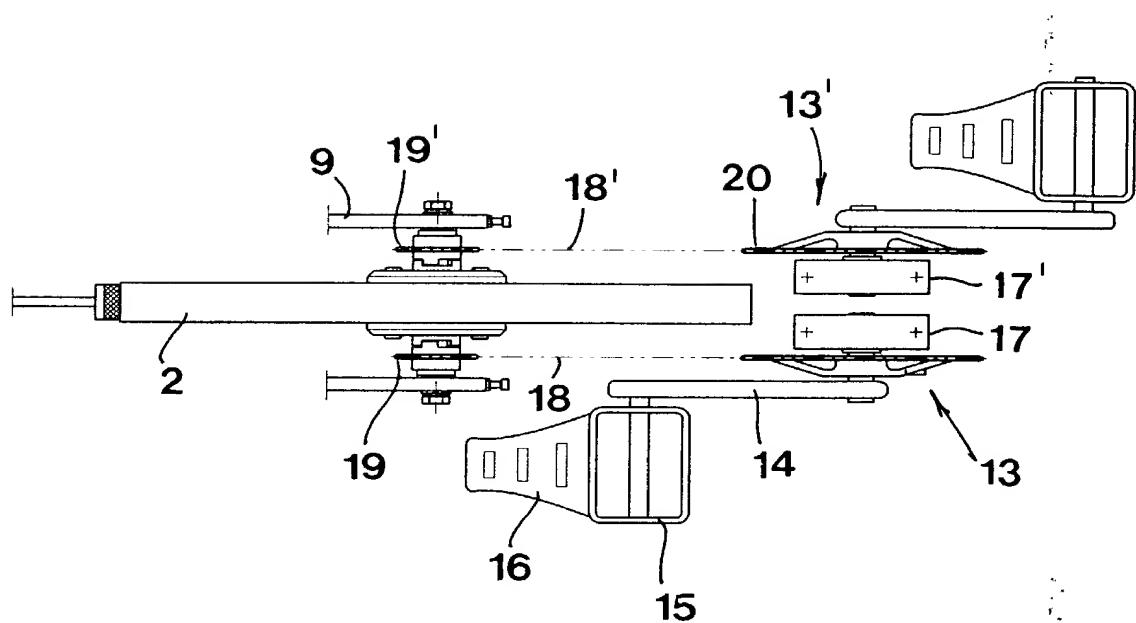
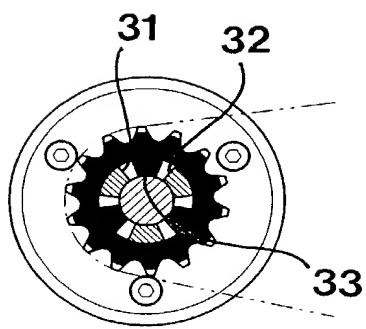
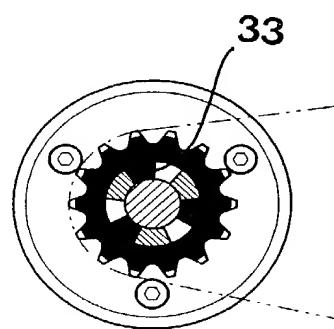


Fig 1

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**Fig 2****Fig 5****Fig 4**

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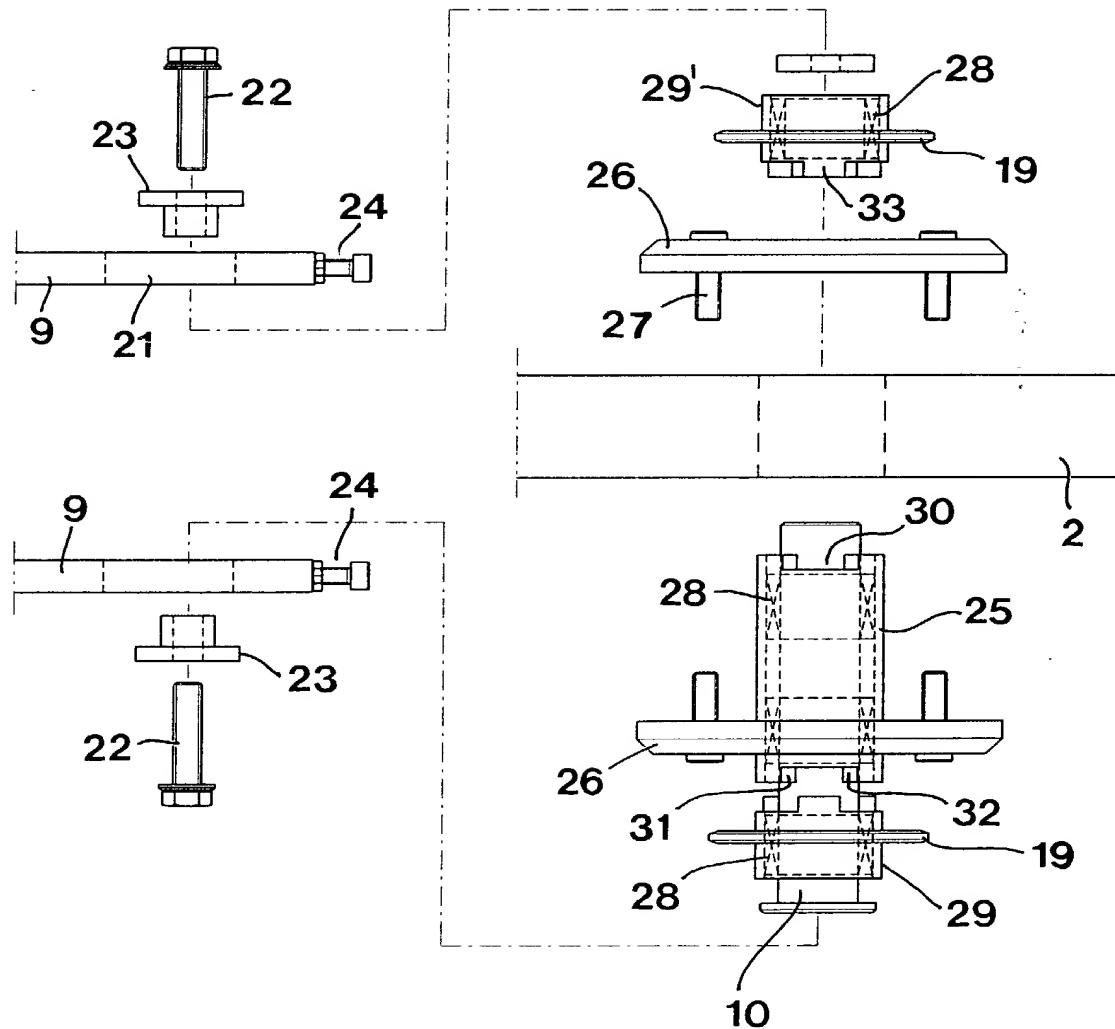


Fig 3

COMBINED DECLARATION AND POWER OF ATTORNEY

As a below named inventor, I hereby declare that

My residence, post office address and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

"Bicycle"

the specification of which: *(check one)*

REGULAR OR DESIGN APPLICATION

is attached hereto.

was filed on _____ as application Serial No.
_____ and was amended on _____ (if applicable).

PCT FILED APPLICATION ENTERING NATIONAL STAGE

was described and claimed in International application No.
PCT/SE 99/00915 filed on May 28, 1999
and as amended on _____ (if any).

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, §1.56.

PRIORITY CLAIM

I hereby claim foreign priority benefits under 35 USC 119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed.

PRIOR FOREIGN APPLICATION(S)

Country	Application Number	Date of Filing (day, month, year)	Priority Claimed
Sweden	9801916-9	29.05.1998	Yes

(Complete this part only if this is a continuing application.)

I hereby claim the benefit under 35 USC 120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of 35 USC 112, I acknowledge the duty to disclose information which is material to patentability as defined in Title 37 Code of Federal Regulations §1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application:

POWER OF ATTORNEY

The undersigned hereby authorizes the U.S. attorney or agent named herein to accept and follow instructions from Lars Johansson Patentbyrå AB as to any action to be taken in the Patent and Trademark Office regarding this application without direct communication between the U.S. attorney or agent and the undersigned. In the event of a change in the persons from whom instructions may be taken, the U.S. attorney or agent named herein will be so notified by the undersigned.

① As a named inventor, I hereby appoint the following attorney(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith: Robert J. PATCH, Reg. No. 17,355, Andrew J. PATCH, Reg. No. 32,925, Robert F. HARGEST, Reg. No. 25,590, Benoît CASTEL, Reg. No. 35,041, Eric JENSEN, Reg. No. 37,855, Thomas W. PERKINS, Reg. No. 33,027, and Roland E. LONG, Jr., Reg. No. 41,949, c/o YOUNG & THOMPSON, Second Floor, 745 South 23rd Street, Arlington, Virginia 22202.

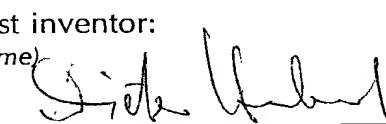
Address all telephone calls to Young & Thompson at 703/521-2297.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Full name of sole or first inventor:

(given name, family name)

Inventor's signature



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Inventor's signature

Date

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Full name of third joint inventor, if any:

(given name, family name)

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Inventor's signature

Date

Residence:

Post Office Address: